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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,027	06/27/2003	Kazuyoshi Serizawa	NIT-377	5615

7590 12/02/2005

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EXAMINER	
VO, THANH DUC	

ART UNIT	PAPER NUMBER
2189	

DATE MAILED: 12/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/607,027	SERIZAWA, KAZUYOSHI	
	Examiner	Art Unit	
	Thanh D. Vo	2189	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 June 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/27/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is responsive to the application filed on June 27, 2003. Claims 1-19 are presented for examination. The examiner hereby acknowledges the Application Priority Date as of November 14, 2002.

Claims 1-19 are pending.

The IDS filed on June 27, 2003 has been considered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 4, 11, and 17 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for "dispersing the access load between the plurality of storage devices or logical units" (see paragraph 0032 in applicant's published application), does not reasonably provide enablement for the claim invention of "allowing the load dispersion...to the groups of allocation" in claims 4, 11, and 17. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

Based on the evidence regarding each of the above factors, the specification, at the time the application was filed, would not have taught one skilled in the art how to

make and/or use the full scope of the claimed invention without undue experimentation. See *In re Wands,* 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988).

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1, 4, 5, 8, 11, 12, 14, and 17-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors.

The applicant is required to rephrase the claim languages in order to clearly pointed out the subject matter disclosed in the specification which applicant regards as the invention. The claim language has to be written in a comprehensible manner to enable a person having an ordinary skill in the computer art to understand the claimed invention. In addition, applicant is required rephrase the claims to avoid any grammatical or idiomatic errors.

6. Claims 1, 8, 14, and 19 recites the limitation "remaining size". There is insufficient antecedent basis for this limitation in the claim. It should be written as "unallocated remaining size".

Claim 11 recites the limitation "group" in line 15. There is insufficient antecedent basis for this limitation in the claim.

7. Claims 4, 5, 11, 12, 17, and 18 are vague. Examiner hereby suggests the applicant to rephrase the claim language in respect to the Summary of the Invention (paragraph 0008 in applicant's published application and respective Detail Descriptions) in order to particularly point out the subject matter which applicant regards as the invention.

8. In claims 4, 11, and 14-18, the term "allowing" is a relative term, which renders the claim indefinite. The term "allowing" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

In claim 14, the term "capability" is a relative term, which renders the claim indefinite. The term "capability" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Appropriate corrections are required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-3, 6-10, 13-16, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Blandy et al. (US Patent 5,390,315).

As per claim 1 and 14, Blandy et al disclosed a storage allocation method and a computer program for allocating a vacant storage region to a virtual volume from a plurality of storage regions (See Fig. 1, item 160) comprising at least one of storage devices (See Fig. 1, item 162) wherein the storage devices provide the storage regions as virtualized volumes (See Fig. 1, item 167) to a host computer (See Fig. 1, col. 4 starting from line 21, and Abstract), said method comprising:

a first step of allocating a storage region for a required size from said vacant storage region until an unallocated remaining size in the required size becomes smaller than a specified maximum region size. See col. 3, lines 32-46.

a second step of, when the unallocated remaining size becomes smaller than the maximum region size, acquiring a storage region, whose size is the smallest power of two not smaller than said unallocated remaining size, from said vacant storage region for allocation. See Fig. 3, col. 9 lines 66 – col. 10 lines 24.

As per claim 2 and 15, Blandy et al. disclosed a storage allocation method and a computer program further comprising a step of, if said vacant storage region includes a plurality of continuous vacant regions, selecting the largest continuous vacant region for allocation. See col. 1, lines 65- col. 2, lines 2 and col. 3 lines 44-46.

As per claims 3 and 16, Blandy et al disclosed a storage allocation method and a computer program further comprising a step of, if said vacant storage region adjoins an allocated storage region on each side thereof, acquiring for allocation a storage region adjoining the allocated storage region (See col. 5, lines 20-25) which is less likely to be released (see col. 5, lines 30-32)

As per claim 6, Blandy et al. disclosed a storage allocation method and a computer program wherein the first step allocates the largest region, whose size is integer times said maximum region size not exceeding said required size, from said vacant storage region. See col. 5, lines 32-38.

As per claim 7, Blandy et al. disclosed a storage allocation method and a program wherein the first step allocates the largest region, whose size is a binary value, which is a power of two, not exceeding said required size, from said vacant storage region. See col. 5, lines 32-55.

As per claim 8, Blandy et al. disclosed a virtualization device, which provides storage regions (see Fig. 1, item 165) maintained by at least one storage device (see Fig. 1, item 160) to a host computer (see Fig. 1, item 110) as virtualized volumes (see Fig. 1, item 167), said virtualization device comprising:

access translation table (See Fig. 1, item 125) means for storing information which is associated between an address of each storage region on a virtual volume

and the addresses of a corresponding logical unit in the storage device and a corresponding storage region in said logical unit (See Fig. 1, item 120, 175, 155 and corresponding description of Fig. 1 the Specifications);

means for translating an input/output request for said virtual volume into an input/output request for the storage region of said storage device with reference to said access translation table means (See Fig. 1, and col. 4, lines 20-58);

means for accepting a request to allocate a vacant storage region to said virtual volume from storage regions of said storage device (See col. 4, lines 66-69, and col. 5, lines 1-7);

means for allocating a storage region for a required size from said vacant storage region until an unallocated remaining size in the required size becomes smaller than a specified maximum region size (See col. 3, lines 32-46);

means for acquiring a storage region, whose size is the smallest power of two not smaller than said remaining size, from said vacant storage region for allocation when said remaining size becomes smaller than said maximum region size (See Fig. 3, and col. 9 lines 66 – col. 10 lines 24); and

means for, after storage allocation is complete for the allocation request, updating a content of said access translation table means based on the allocation result (See col. 10, line 6-11).

As per claim 9, Blandy et al. disclosed a virtualization device further comprising means for, if said vacant storage region includes a plurality of continuous vacant

regions, selecting the largest continuous vacant region for allocation. See col. 1 lines 65 – col. 2, line 2, and col. 3, lines 44-46.

As per claim 10, Blandy et al. disclosed a virtualization device further comprising means for, if said vacant storage region adjoins an allocated storage region on each side thereof, acquiring for allocation a storage region adjoining the allocated storage region which is less likely to be released. See col. 5, lines 20-32.

As per claim 13, Blandy et al. disclosed a storage device (see Fig. 1, item 167) incorporating the virtualization device.

As per claim 19, Blandy et al. disclosed a system comprising:

at least one storage device (Fig. 1, item 162) maintaining a real storage region (Fig. 1, item 160);

at least one host processor (Fig. 1, item 110) which initiates data read and write from and to said real storage region of said storage device;

a virtualization device (Fig. 1, item 167) which interferes between said host processor 110 and said storage device 162 and provides virtual volumes (Fig. 1, item 165) to said host processor 110; and

a management console (Fig. 1, item 115) which issues a request said virtualization device to allocate a storage region for a virtual volume (col. 4, lines 33-36);

wherein said virtualization device comprises:

access translation table (Fig. 1, item 125) means for storing information on associativity between an address of each storage region on the virtual volume and the addresses of a corresponding logical unit in the storage device and a corresponding storage region in said logical unit (see col. 4, line 59 – col. 5, line 9);

means for translating an input/output request for said virtual volume into an input/output request for the storage region of said storage device with reference to said access translation table means (see col. 4, line 59 – col. 5, line 9).

means for accepting from said management console a request to allocate a vacant storage region to said virtual volume from storage regions of said storage device (see col. 5, lines 2-26);

means for allocating a storage region for a required size from said vacant storage region until an unallocated remaining size in the required size becomes smaller than a specified maximum region size (see col. 3, lines 32-46);

means for acquiring a storage region, whose size is a binary value, which is the smallest power of two not smaller than said remaining size, from said vacant storage region for allocation when said remaining size becomes smaller than said maximum region size (see Fig. 3, and col. 9 lines 66 – col. 10 lines 24);

means for updating a content of said access translation table means based on the allocation result after storage allocation is complete for the allocation request. See col. 10, lines 6-11.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4, 11, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blandy et al. (US 5,390,315) in view of Obara et al. (US 6,378,039).

As per claim 4, 11, and 17, Blandy et al. disclosed a storage allocation method and a computer program further comprising a step of, vacant storage regions are sorted into a plurality of groups and divided the virtual volume into a plurality of divisions, dividing the required size according to the specified number of divisions and assigning the divided sizes respectively to the groups for allocation. See col. 1, lines 43- col. 2, lines 2; col. 3, lines 32-46; and col. 9, line 66 – col. 10, lines 24.

Blandy et al. also taught the method of reducing the radial reader movement in the storage system which will reduce the accessing load into the storage device. Blandy et al. failed to disclose a method of load balancing (load dispersion).

Obara et al. taught a method of balancing the loads across a plurality of disk controllers, disk devices and sub disk controllers, wherein each storage is divided into plurality of logical volumes and each storage is coupled to a disk controllers. The method of Obara et al. will allow the accessing load to be evenly distributed across the

storage regions and divisions of a storage device. See col. 2, lines 12-20, and col. 8, lines 50-63; and Fig. 6(a,b).

Blandy et al. and Obara et al. are analogous art because they are from the same field of endeavor and storage system.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify the method of Blandy et al. to combine with the method taught by Obara et al. to arrive the invention claim in claim 4 and 17.

The motivation of for doing so would have been providing a storage system to efficiently use all of the resources provided by the system therefore the storage system will performance at a higher rate and yielding higher throughput.

Allowable Subject Matter

Claims 5, 12, and 18 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh D. Vo whose telephone number is (571) 272-0708. The examiner can normally be reached on M-F 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Kim can be reached on (571) 272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thanh D. Vo

Patent Examiner

11/28/2005

TUAN V. THAI
PRIMARY EXAMINER